

a modifier coupled to said first and second inputs and responsive to the variability [characteristics] information of the background noise parameter for [modifying] perturbing the comfort noise parameter values to produce [modified] perturbed comfort noise parameter values; and

an output coupled to said modifier for providing said [modified] perturbed comfort noise parameter values for use in generating perturbed comfort noise.

21. (Amended) The apparatus of Claim 17 [20], wherein said variability estimator includes a mean variability determiner for producing mean variability information indicative of how the background noise parameter varies relative to a mean value of the background noise parameter.

REMARKS

In response to the Office Action dated February 13, 2002, the Applicant has canceled Claims 9-10, 20, 23 and 30 and amended Claims 1, 17 and 21. Thus, Claims 1-8, 11-19, 21-22, 24-29 and 31 remain pending in the application. Reconsideration of the claims, as amended, is respectfully requested.

Claims 1-31 were rejected under 35 U.S.C. § 102(e) as being anticipated by Jarvinen et al. Claim 1 has been amended to more particularly illustrate the steps of:

"calculating, at the speech decoder, variability information indicative of variability of a background noise parameter, wherein said calculation step includes the speech decoder obtaining the variability information independently of the communication channel;

in response to the variability information, perturbing the comfort noise parameter values to produce modified comfort noise parameter values at the speech decoder; and

generating comfort noise perturbed according to the modified comfort noise parameter values at the speech decoder."

Each of the steps occur at the speech decoder. The Jarvinen reference describes a system operating within the encoder rather than the decoder as recited in Applicant's method. Also, the cited reference describes the calculation of comfort noise parameters on a frame by frame basis and discarding frames which deviate too much from a mean parameter set. The selected parameters are averaged and used for comfort noise parameters transmitted in the SID frame. The Applicant's invention perturbs the comfort noise parameter values to produce a perturbed comfort noise parameter and generates comfort noise parameters according to the perturbed comfort noise parameter values. The Jarvinen reference aims to smooth the comfort noise values rather than to perturb them. Therefore, the Applicant

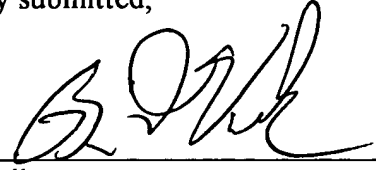
respectfully submits that Claim 1, and all claims dependent therefrom, is distinguishable from the art of record and a Notice of Allowance is respectfully requested.

Claim 17 has been amended in a manner similar to Claim 1. More particularly, Claim 17 has been amended to include a variability estimator responsive to the background noise parameters for calculating variability information and a modifier responsive to the variability information of the background noise parameter for perturbing the comfort noise parameters values to produce perturbed comfort noise parameter values. Applicant respectfully submits that Claim 17, is distinguishable from the Jarvinen reference for reasons similar to those discussed with respect to Claim 1. Therefore, the Applicant respectfully submits that Claim 17, and all Claims dependent therefrom, is distinguishable from the art of record and a Notice of Allowance is respectfully requested.

In view of the foregoing amendments and comments, the Applicant respectfully submits that all pending claims are allowable over the art of record. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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CLEAN SET OF PENDING CLAIMS AFTER RESPONSE TO OFFICE ACTION
DATED 2/13/02:

AI 1 1. (Amended) A method of generating comfort noise in a speech decoder that
2 receives speech and noise information from a communication channel, comprising:
3 providing a plurality of comfort noise parameter values normally used by the
4 speech decoder to generate comfort noise;
5 calculating, at the speech decoder, variability information indicative of variability
6 of a background noise parameter, wherein said calculation step includes the speech
7 decoder obtaining the variability information independently of the communication
8 channel;
9 in response to the variability information, perturbing the comfort noise parameter
10 values to produce modified comfort noise parameter values at the speech decoder; and
11 generating comfort noise perturbed according to the modified comfort noise
12 parameter values at the speech decoder.

1 2. The method of Claim 1, wherein the background noise parameter is a
2 spectrum parameter.

1 3. The method of Claim 1, wherein the background noise parameter is an
2 energy parameter.

1 4. The method of Claim 1, wherein said obtaining step includes obtaining
2 variability information indicative of variability of a background noise spectrum
3 parameter and a background noise energy parameter.

1 5. The method of Claim 1, wherein said obtaining step includes computing
2 from a plurality of values of the background noise parameter a mean value of the
3 background noise parameter, and subtracting the mean value from each background
4 noise parameter value to produce a plurality of deviation values.

1 6. The method of Claim 5, wherein said modifying step includes selecting
2 one of said deviation values randomly, scaling the randomly selected deviation value by
3 a scale factor to produce a scaled deviation value, and combining the scaled deviation
4 value with one of the comfort noise parameter values to produce one of the modified
5 comfort noise parameter values.

1 7. The method of Claim 1, wherein said speech decoder is provided in a
2 radio communication device.

1 8. The method of Claim 7, wherein speech decoder is provided in a cellular
2 telephone.

1 9. ~~Canceled.~~

1 10. Canceled.

1 11. The method of Claim 1, wherein said variability information includes
2 mean variability information indicative of how the background noise parameter varies
3 relative to a mean value of the background noise parameter.

1 12. The method of Claim 11, wherein said obtaining step includes using a
2 plurality of values of the background noise parameter to calculate a mean value of the
3 background noise parameter over a period of time, and comparing the mean value to at
4 least some of the background noise parameter values to produce mean-removed values
5 of the background noise parameter.

1 13. The method of Claim 12, wherein said obtaining step includes using the
2 plurality of values of the background noise parameter to calculate filter coefficients, and
3 filtering at least some of the mean-removed values of the background noise parameter
4 according to the filter coefficients.

1 14. The method of Claim 13, wherein said last-mentioned using step includes
2 calculating filter coefficients of an auto-regressive predictor filter.

1 15. The method of Claim 11, wherein said variability information includes
2 time variability information indicative of how the background noise parameter varies
3 over time.

1 16. The method of Claim 1, wherein said variability information includes
2 time variability information indicative of how the background noise parameter varies
3 over time.

1 17. (Amended) An apparatus for producing comfort noise parameters for
2 use in generating comfort noise in a speech decoder that receives speech and noise
3 information from a communication channel, comprising:

4 a first input for providing a plurality of comfort noise parameter values normally
5 used by the speech decoder to generate comfort noise;

6 a second input for providing a background noise parameter;

7 a variability estimator coupled to said second input and responsive to the
8 background noise parameter for calculating variability information;

9 a modifier coupled to said first and second inputs and responsive to the
10 variability information of the background noise parameter for perturbing the comfort
11 noise parameter values to produce perturbed comfort noise parameter values; and

12 an output coupled to said modifier for providing said perturbed comfort noise parameter
13 values for use in generating perturbed comfort noise.

1 18. The apparatus of Claim 17, wherein the background noise parameter is a
2 spectrum parameter.

1 19. The apparatus of Claim 17, wherein the background noise parameter is an
2 energy parameter.

1 20. ~~Canceled.~~

1 21. (Amended) The apparatus of Claim 17 [20], wherein said variability
2 estimator includes a mean variability determiner for producing mean variability
3 information indicative of how the background noise parameter varies relative to a mean
4 value of the background noise parameter.

1 22. The apparatus of Claim 21, wherein said mean variability determiner is
2 provided in the speech decoder.

1 23. ~~Canceled.~~

1 24. The apparatus of Claim 21, wherein said mean variability determiner is
2 responsive to a plurality of values of the background noise parameter for calculating a
3 mean value of the background noise parameter over a period of time, and is further
4 operable to compare the mean value to at least some of the background noise parameter
5 values to produce mean-removed values of the background noise parameter.

1 25. The apparatus of Claim 24, wherein said variability information includes
2 time variability information indicative of how the background noise parameter varies
3 over time.

1 26. The apparatus of Claim 25, wherein said variability estimator includes a
2 coefficient calculator responsive to a plurality of values of the background noise
3 parameter for calculating filter coefficients, said time variability information including
4 the filter coefficients.

1 27. The apparatus of Claim 26, wherein said filter coefficients are filter
2 coefficients of an auto-regressive predictor filter.

1 28. The apparatus of Claim 26, including a filter coupled to said coefficient
2 calculator for receiving therefrom said filter coefficients, and coupled to said mean
3 variability determiner for filtering at least some of the mean-removed background noise
4 parameter values according to said filter coefficients.

1 29. The apparatus of Claim 26, wherein said coefficient calculator is
2 provided in the speech decoder.

1 30. ~~Canceled.~~

- 1 31. The apparatus of Claim 20, wherein said variability information includes
- 2 time variability information indicative of how the background noise parameter varies
- 3 over time.